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Difference in performance between OPU and slaughterhouse derived oocytes

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CRV is continuously working on further improvement the IVP embryo production process. In that process new commercial media or modification of in the standard CRV (in house made) media are tested. These media are always first tested in several experiments using slaughterhouse derived oocytes. If the embryo production rate of those experiments look good, i.e. are at least similar or better than the control (=CRV standard medium), a trial using OPU derived oocytes is started.

The aim of this study is to check whether the results of these media trials obtained with slaughterhouse oocytes are representative for those obtained with OPU derived oocytes.

Oocytes for the slaughterhouse trials are derived from ovaries of animals (mainly HF) that are slaughtered because of low production, fertility problems, etc.. These ovaries are transported (transport time ~6Hrs) at 30 °C to the IVP lab. Upon arrival oocytes are collected and quality 1 and 2 oocytes (50:50 ratio) are used for the experiments.

Oocytes for the OPU trials, are collected from animals (mostly heifers) at our own CRV station. In this case also mainly quality 1 (28%) and 2 (66%) is used in the experiments (remaining part are some quality II and IV).

Subsequently, both groups of oocytes (slaughterhouse and OPU derived) are used for in vitro production of embryos using the standard CRV media (=control) or using a new serum free medium (=test medium). The standard CRV protocol starts with a 24 hr maturation in M199 supplemented with 10% FCS, LH&FSH plus cysteamine, followed by a fertilisation for 24 hrs and a culture of 7 days in SOF-BSA medium with 0.2% serum. In the test group we used serum free media (both IVM and IVC), but supplemented the IVM and IVC media with EGF. For the slaughterhouse we did 5 different sessions for the test and control medium. In the OPU experiments we did 125 different sessions for the test medium and 178 for the control.

The results of the slaughterhouse clearly indicated that the test medium is better than the control (% total embryos 29% and 24%, respectively, $P<0.05$ Chi square test). However, the OPU results were completely different. In that case the test group was significantly worse than the control group (36% compared to 43% total embryos, $P<0.05$ Chi square test). If you look at only the quality 1+2 embryos (i.e., the transferable ones) the same pattern was observed.

From these results it is clear that the test medium, when used in combination with slaughterhouse derived oocytes, is significantly better than the control medium. However, when OPU derived oocytes are used, the test medium is significantly worse than the control medium. This is a phenomena we also see in other trials with different media.

It is difficult to explain these results. It might be because of the higher percentage of class 2 oocytes in the OPU derived group. Potentially class 2 oocytes are more sensitive to different (potentially less optimal) media.

We therefore conclude that you have to be very careful in making a decision to switch to new IVP medium based on slaughterhouse experiments only.

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